植物研究雑誌
J. Jpn. Bot.
81: 154–167 (2006)

A Revision of the Genus *Spenceria* Trimen (Rosaceae)

Hiroshi IKEDA[a], Kumiko HANDA[b], Su-Kung WU[c] and Hideaki OHBA[d]

[a]Department of Biosphere-Geosphere System Science, Faculty of Informatics,
Okayama University of Science, 1–1, Ridai-cho, Okayama, 700-0005 JAPAN;
E-mail: ikeda@big.ous.ac.jp
[b]Division of Natural History, Museum of Nature and Human Activities,
6, Yayoigaoka, Sanda, Hyogo, 669-1546 JAPAN;
[c]Herbarium, Kunming Institute of Botany, Academia Sinica, Kunming, Yunnan, 650204 CHINA;
[d]Department of Botany, University Museum, University of Tokyo,
7–3–1, Hongo, Bunkyo-ku, Tokyo, 113-0033 JAPAN

(Received on January 7, 2006)

The monotypic genus *Spenceria* Trimen (Rosaceae) is fully revised. *Spenceria parviflora* Stapf is regarded as a variety of *S. ramalana* Trimen. Descriptions of the genus, species and variety, a distribution map, line drawings of floral organs, pollen grains, chromosome numbers, and specimens examined of the two varieties are given.

Key words: Chromosome number, pollen morphology, Rosaceae, *Spenceria*, taxonomic revision.

Spenceria (Rosaceae) is a monotypic genus comprising *S. ramalana* that occurs in alpine and subalpine grasslands in the Sino-Himalayan region. Trimen (1879) established the genus when he described *S. ramalana* from a single collection made at La-Ma-La, SW. Sichuan by R. E. Gill. Trimen's description, however, was incomplete due to the fragmentary nature of the specimen, which had only a flowering stem with a few flowers and no radical leaves. Franchet (1890) supplemented the description from specimens collected by Delavay in Yunnan. Although Stapf (1923) described *S. parviflora* which is smaller than *S. ramalana* and has smaller flowers, from E. Bhutan, it has generally been treated as a variety or as a synonym of *S. ramalana* (Kitamura 1954, Yü and Li 1985, Yü et al. 1985, Ku 1993).

Kalkman (1988) classified *Spenceria* and allied genera in the tribe Sanguisorbeae in the subfamily Rosoideae. Stapf (1923) pointed out that *Spenceria* is related to *Aremonia*, a monotypic SE. European genus comprising *A. agrimonioides* (L.) DC., although Hooker (1865) considered *Aremonia* to be congeneric with *Agrimonia*.

The relatively large pentamerous flowers and multiseriate stamens of *Spenceria* have been considered to be primitive in the Sanguisorbeae, but the presence of episepals and cup shaped involucres are considered to be derived. Thus *Spenceria* is an appropriate genus for the study of evolution in the Sanguisorbeae as well as its phytogeography. Until now, the floral morphology and variation have not been sufficiently studied, and the cytology has been unexplored.

Notes on some morphological and cytological features

Flower (Figs. 1–2)

Variation in the flowers of *Spenceria ramalana* was observed in dried specimens collected in the field in Yunnan, Sichuan, and Xizang (Tibet) between 1994 and 2001,

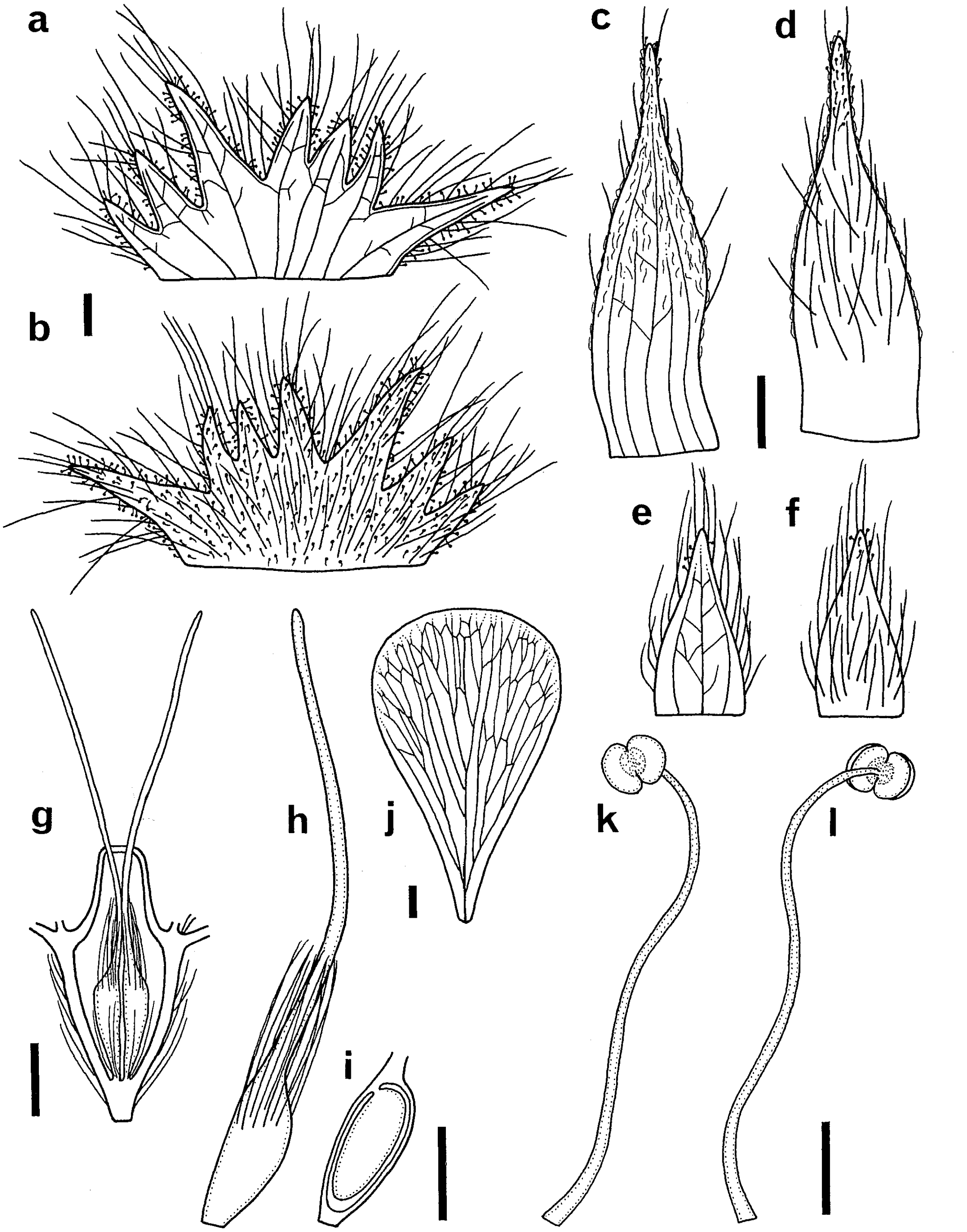

Fig. 1. *Spenceria ramalana* Trimen var. *ramalana* (S. K. Wu & al. 1232, TI). a, b: Involucres, inner surface (a) and outer surface (b). c, d: Sepals, inner surface (c) and outer surface (d). e, f: Episepals, inner surface (e) and outer surface (f). g: Longitudinal section of a flower. h, i: Pistil. j: Petal. k, l: Stamens, inner surface (k) and outer surface (l). Bars = 1 mm.

and in herbarium specimens.

The flowers of *Spenceria ramalana* have a bract at the base of the pedicel, and a cup shaped involucre that partially covers the obconical hypanthium. The involucre has 7–8 lobes, of which two opposite each other are larger than others. The hypanthium becomes hard in fruit and is easily removed from the involucre at the point of attachment of an articulate structure between the involucre and the hypanthium. Yü and Li (1985) and Yü et al. (1985) wrongly used the term "episepals" for the involucres, and they did not describe episepals on the hypanthium. It is apparent that *Spenceria* has episepals alternate with the sepals. A disk closes the mouth of the hypanthium, except for the central part, and forms a short tube.

Although Yü and Li (1985) and Yü et al. (1985) described the flowers as having an ovary with two separate styles, it is clear that the flowers have two pistils attached to the base of the hypanthium. The styles are free, nearly terminal and protrude from the tube of the disk. Each ovary has a single, pendulous ovule.

The presence of two pistils is unique to the Sanguisorbeae and is shared by *Spenceria*, *Aremonia*, and *Agrimonia*. Among them *Spenceria* and *Aremonia* have cup shaped involucres, which are probably derived from fusion of the paired bracteoles that *Agrimonia* retains.

Pollen grain (Fig. 3)

Pollen grains are morphologically diverse in the Rosaceae (Reitsma 1966, Eide 1981, Hebda and Chinnappa 1994). Pollen morphology of *Spenceria* has, however, been only briefly described by Ying et al. (1993), Hebda and Chinnappa (1994), and Wang et al. (1997).

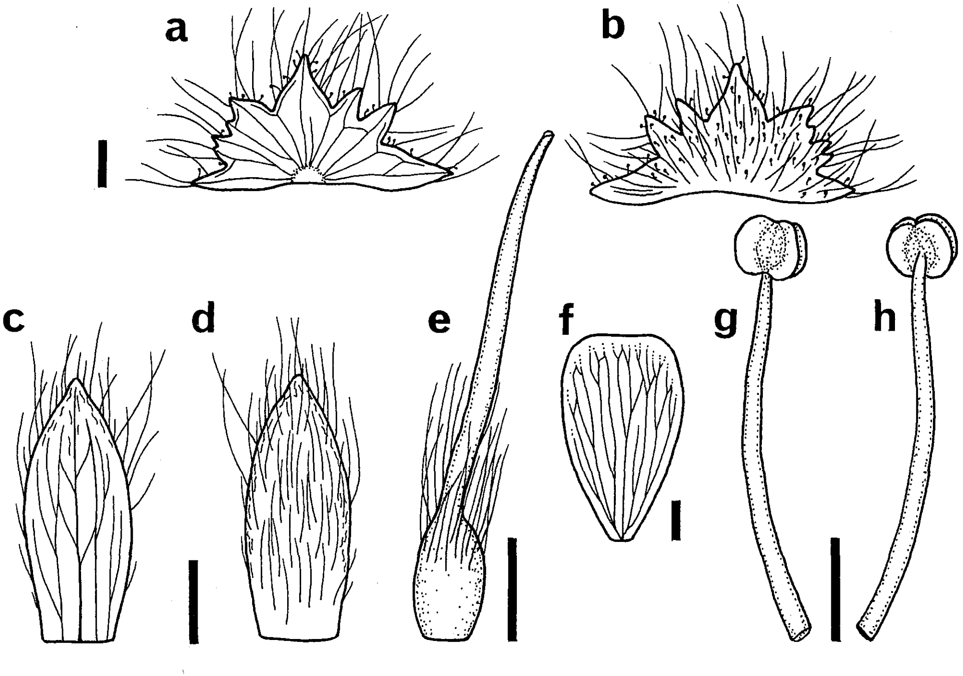

Fig. 2. *Spenceria ramalana* Trimen var. *parviflora* (Stapf) Kitam. (S. Akiyama & al. 104736, TI). a, b: Involucres, inner surface (a) and outer surface (b). c, d: Sepals, inner surface (c) and outer surface (d). e: Pistil. f: Petal. g, h: Stamens, inner surface (g) and outer surface (h). Bars = 1 mm.

Pollen grains were taken from dried specimens collected in NW. Yunnan in 1994 for var. *ramalana* and SE. Tibet in 2000 for var. *parviflora*. For light microscopy (LM), the pollen grains were treated with 10 % KOH, acetolyzed and mounted in glycerine jelly. Measurements were made of 50 grains. For the scanning electron microscopy (SEM), acetolysed pollen grains were dehydrated, fixed to stubs, and coated with gold. The terminology follows Hebda et al. (1988) and Punt et al. (1994).

Our observations confirm the description by Hebda and Chinnappa (1994). Pollen grains are monads, isopolar, radially symmetrical, and trizonocolporate. They are subcircular in polar view and prolate to subprolate circular in equatorial view. In our observations the grains were 33.4 (26.0–38.0) μm for var. *ramalana* and 36.0 (32.5–42.5) μm for var. *parviflora* in polar axes, 23.7 (20.0–27.5) μm for var. *ramalana* and

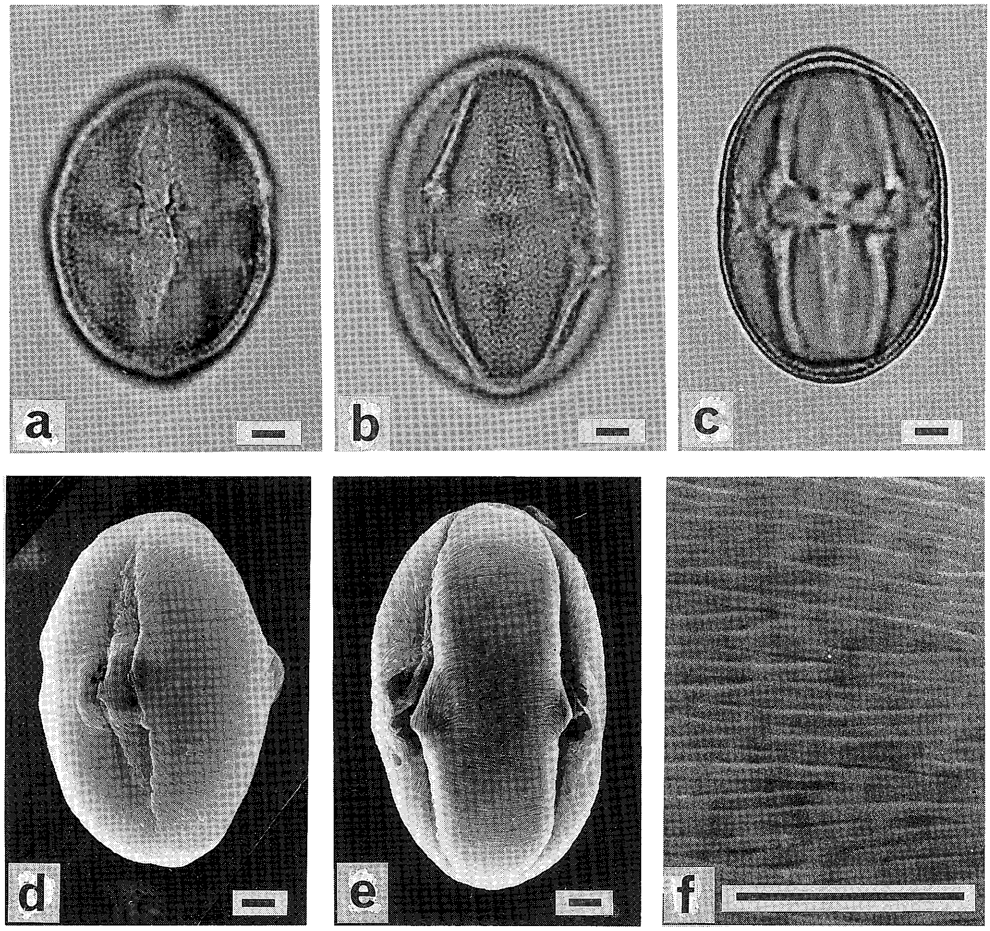

Fig. 3. Pollen grains of *Spenceria ramalana* Trimen var. *ramalana* (S. K. Wu & al. 1232, TI). a: Equatorial view showing aperture, LM. b: Equatorial view, LM. c: Equatorial optical cross section, LM. d: Equatorial view showing aperture, SEM. e: Equatorial view showing ornamentation, SEM. f: Detail of sculpturing in mesocolpium showing ridges perpendicular to colpus, SEM. Bars = 2 μm.

23.5 (20.0–27.5) μm for var. *parviflora* in equatorial diameters, 1.41 (1.18–1.60) for var. *ramalana* and 1.53 (1.36–1.70) for var. *parviflora* in P/E ratio. The ectoaperture is an elongated tapering colpus, about 2–3 μm wide in the equatorial region. Polar area indices are 0.30 (0.22–0.36). The colpus membrane is granulate or partially covered by a narrow operculum. The margin of the colpus is weakly undulate and protrudes in the equatorial area. The endoaperture is an obscure, equatorially elongated colpus, 7–15 μm long and 2–4 μm wide.

The exine is tectate with supramicrostriae, and thickened in the apocolpium. The ridges are 0.1–0.2 μm wide, dense, straight, long, arranged perpendicular to the colpus, and with 3.8 anastomoses per 10 μm of ridge. Microstriae run around or parallel to the colpus on the protruding part of the colpus margin. The operculum has microstriae parallel to the colpus.

This fine microstriae can be observed with SEM, instead of the apparent microreticulate sculptural pattern observed with LM. The columellae are thicker than the width of the muri and are sparse.

Pollen grains of *Spenceria* are tricolporate and microstriate without perforations. The sculptural ridges are narrow and dense, and run perpendicular to the colpus. The direction of the ridges is unique in the Rosaceae, and this type of sculpturing is observed only in *Spenceria*, *Agrimonia* and *Aremonia* (Hebda and Chinnappa 1994).

Chromosome (Fig. 4)

Somatic chromosomes were observed using meristematic cells of shoot apices collected at six localities in NW. Yunnan, SW. Sichuan and SE. Tibet between 1994 and 2001 (Table 1). Shoot apices were pretreated with 2 mM 8-hydroxyquinoline solution for 2–3 hours in the field and were fixed with Newcomer's fluid (see Sharma and Sharma 1980). They were macerated with 1 N HCl at 60°C for 10 minutes, stained with 2 % lacto-propionic orcein, and squashed for cytological observations. All voucher specimens are deposited in TI and KUN.

Chromosomes of *S. ramalana* were counted for the first time and revealed a somatic number of $2n = 14$ for both vars. *ramalana* and *parviflora*. The chromosomes of the complement show a gradual decrease in length from about 3.0 μm to about 2.2 μm and have centromeres at the median or submedian position. No satellite chromosomes were observed.

According to previous reports, *Aremonia* has a chromosome number of $2n = 42$ (Löve 1978, 1981), and *Agrimonia* has $2n = 28, 56$ (Hara and Kurosawa 1968). From our results, the basic chromosome number of

Table 1. Localities, elevations, voucher specimens and chromosome numbers of *Spenceria ramalana*. All voucher specimens are deposited at KUN and TI

Locality	Voucher specimen	Chromosome number (2n)
var. *ramalana*		
Yunnan: Lijiang; Ganhaizi, 4250 m	S. K. Wu & al. 838	14
Yunnan: Zhongdian; near Shudu Hu, 3220 m	S. K. Wu & al. 1232	14
Sichuan: Daocheng; Haizi, 3070 m	S .K. Wu & al. 880	14
Xizang: Changdu; near Markam, 3850 m	S. Akiyama & al. 104601	14
var. *parviflora*		
Xizang: Maizhokunggar; Mt. Milha Shan, 4120 m	S. Akiyama & al. 106216	14
Xizang: Nyingchi; near Basum Hu, 3420 m	S. Akiyama & al. 104736	14

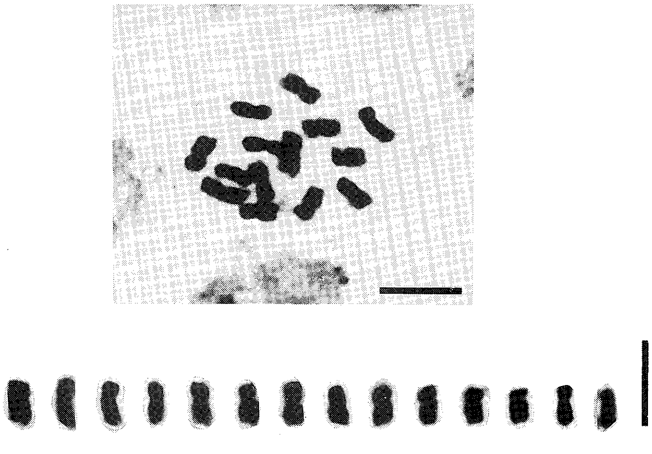

Fig. 4. Somatic chromosomes of *Spenceria ramalana* var. *ramalana* (2n = 14) (S. K. Wu & al. 1232). Bars = 5 μm.

Spenceria, *Aremonia* and *Agrimonia* is confirmed as x = 7, and *S. ramalana* is the only diploid species within the three genera.

Taxonomic treatment

Spenceria Trimen in J. Bot. (Hooker) **17**: 97 (1879, April).

Type: *Spenceria ramalana* Trimen.

Spenceria is monotypic and consists only of *S. ramalana*.

Spenceria ramalana Trimen in J. Bot. (Hooker) **17**: 97, t. 201 (1879).

Type: China. Sichuan. In monte dicto Ra-Ma-La, Chinae occidentalis, alt. ca. 14300 ft. (R. E. Gill in 1877, K–holo; Fig. 5).

Hermaphroditic perennial herbs. Rhizomes stout, ligneous, upper part densely covered with old petioles. Radical leaves oblanceolate, imparipinnate, 5–20 cm long, 1.0–3.5 cm wide, pilose on both surfaces, rachis, and petioles. Leaflets 4–10 pairs, oblong to obovate, subsessile, apex bi- or tridentate, base broadly cuneate or shallowly cordate, lateral leaflets gradually reduced in size toward base; terminal leaflet 1.0–2.0 cm long, 0.5–1.0 cm wide. Petiole 2.5–4.0 cm long, dilated at base.

Inflorescence a raceme, 7–35 cm long, with 2–6 cauline leaves and 4–20 flowers; flowering stems densely pilose. Cauline leaves imparipinnate, lower ones with 1–3 pairs of leaflets, upper ones simple, 1.5–4.5 cm long, 1.0–1.5 cm wide, pilose on both surfaces, rachis, petioles, and stipules. Petiole 0.5–1.5 cm long. Stipules adnate to lower half of petiole, surrounding flowering stem; auricles free, lanceolate to ovate, entire or 2- or 3-incised.

Flowers June to August, pedicellate, 1–2 cm across, with a bract at base of pedicel, and an involucre near flower. Pedicel densely pilose, 1–3 cm long. Bracts usually simple, with leafy stipules, 0.8–2.5 cm long, 4–8 mm wide, pilose on both surfaces, petioles, and stipules. Involucre cup shaped, 7- or 8-lobed, with long hairs and short glandular hairs outside, glabrous inside; lobes narrowly ovate to lanceolate, apex acute or obtuse, 2 opposite ones larger than others. Hypanthium obconical, with long hairs outside, glabrous inside. Episepals developed or obscure. Sepals 5, alternate with episepals,

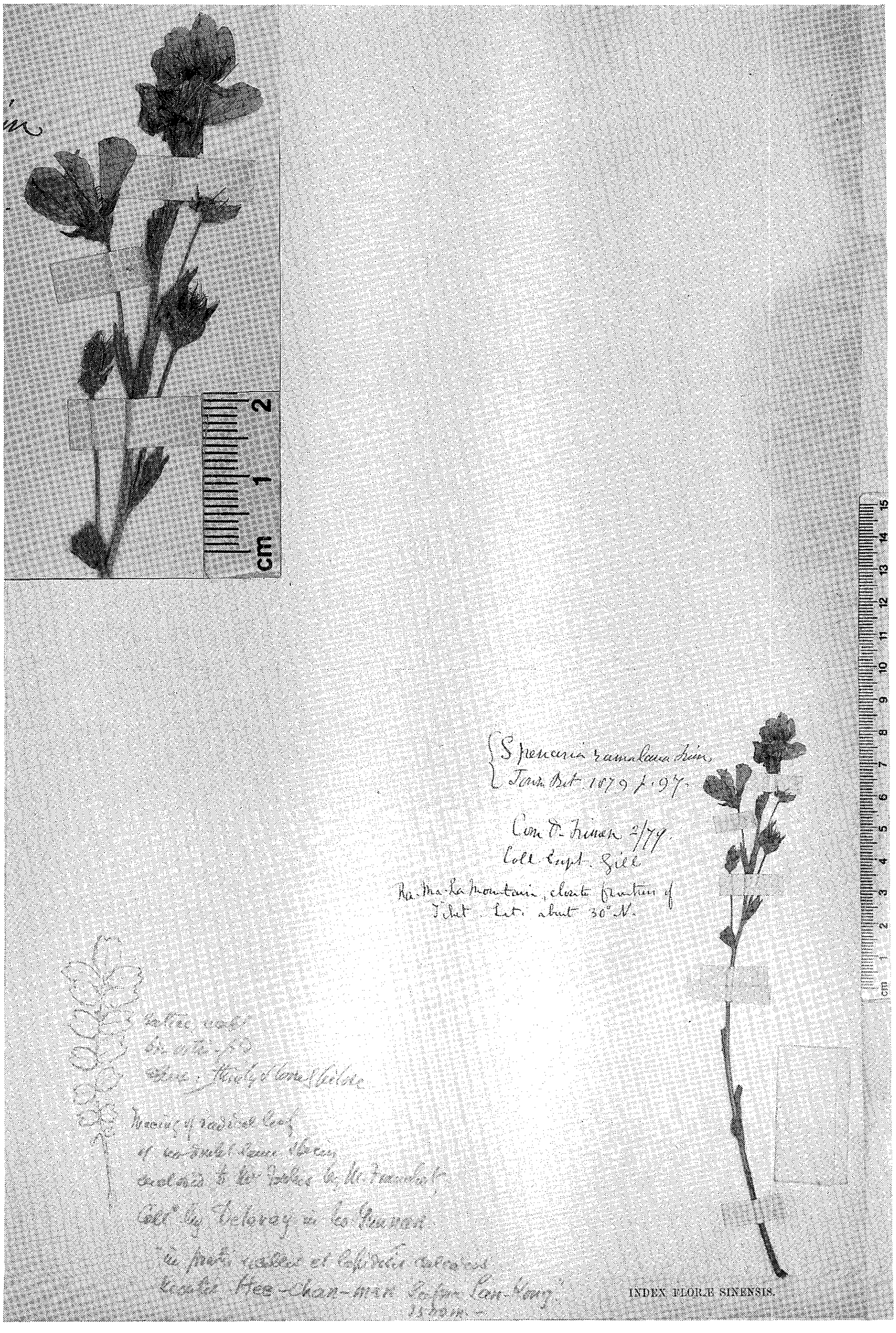

Fig. 5. *Spenceria ramalana* Trimen var. *ramalana* (R. E. Gill s. n., holotype of *S. ramalana*, K).

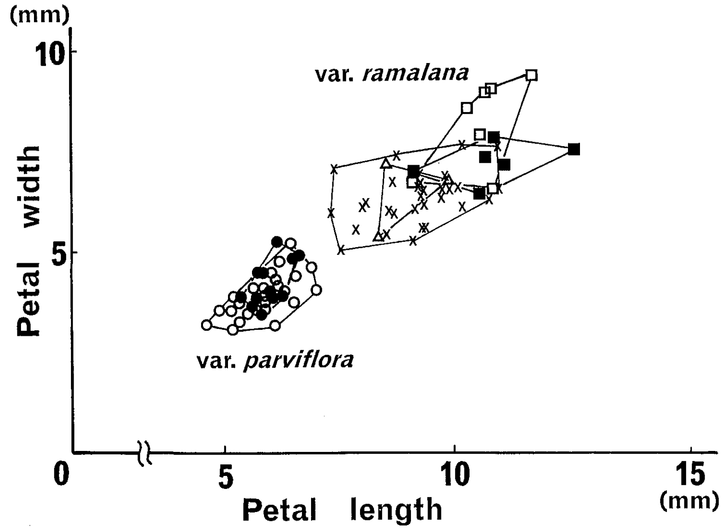

Fig. 6. Relationship between petal length and petal width in *Spenceria ramalana* Trimen. ■: Lijiang, Ganhaizi, 4250 m, Yunnan (S. K. Wu & al. 838). □: Zhongdian, Tianchi, 3350 m, Yunnan (S. Akiyama & al. 661). △: Zhongdian, near Shudu Hu, 3220 m, Yunnan (S. K. Wu & al. 1232). ×: Markam Xian, near Markam, 3850 m, Xizang (Tibet) (S. Akiyama & al. 104601). ●: Maizhokunggar Xian, Mt. Milha Shan, 4120 m, Xizang (Tibet) (S. Akiyama & al. 106216). ○: Nyingchi Xian, near Basum Hu, 3420 m, Xizang (Tibet) (S. Akiyama & al. 104736).

broadly linear to lanceolate, apex acute to acuminate, unguiculate at base, with long simple hairs except at base and with glandular hairs at apex outside, with long and short simple hairs except at base inside. Disk closing mouth of hypanthium except central part, forming a short tube. Petals 5, bright yellow, alternating with sepals, oblanceolate to obovate, apex rounded or slightly retuse. Stamens 10–40, in 2 or 3 whorls; filaments filiform, pale yellow, 6–8 mm long; anthers basifixed, sphaeroidal, 0.3–0.7 mm across, thecae 2, orange yellow before dehiscence. Pistils 2, attached to base of hypanthium; ovaries obliquely oblong, 1.1–2.0 mm long, 0.5–0.9 mm wide, with long hairs apically; styles subterminal, 3.0–7.0 mm long, protruding from tube of disk; stigmas punctate. Ovules 1 per ovary, pendulous, oblong, 0.8–1.4 mm long, 0.2–0.5 mm wide; placenta located ventro-laterally near style base.

Achene enclosed in hardened hypanthia, nearly globose, 3.0–4.0 mm across.

Key to the varieties of *Spenceria ramalana*

1. Flowers 1.5–2.0 cm across; episepals developed; petals 8–13 mm long, 6–9 mm wide, with clawed base; stamens 20–40 .... var. *ramalana*

1. Flowers ca. 1 cm across; episepals obscure; petals 5–7 mm long, 3–5 mm wide; with cuneate base; stamens 10–18 .... var. *parviflora*

var. **ramalana**: Franch., Pl. Delav.: 216, t. 45 (1890). Forbes & Hemsley in J. Linn. Soc. **23**: 246 (1887). Diels in Notes Roy. Bot. Gard. Edinburgh **6**: 158 (1912). Breslau in Fedde, Repert. Spec. Nov. Regni Veg. Beih. **12**: 413 (1922). Stapf in Curtis's Bot.

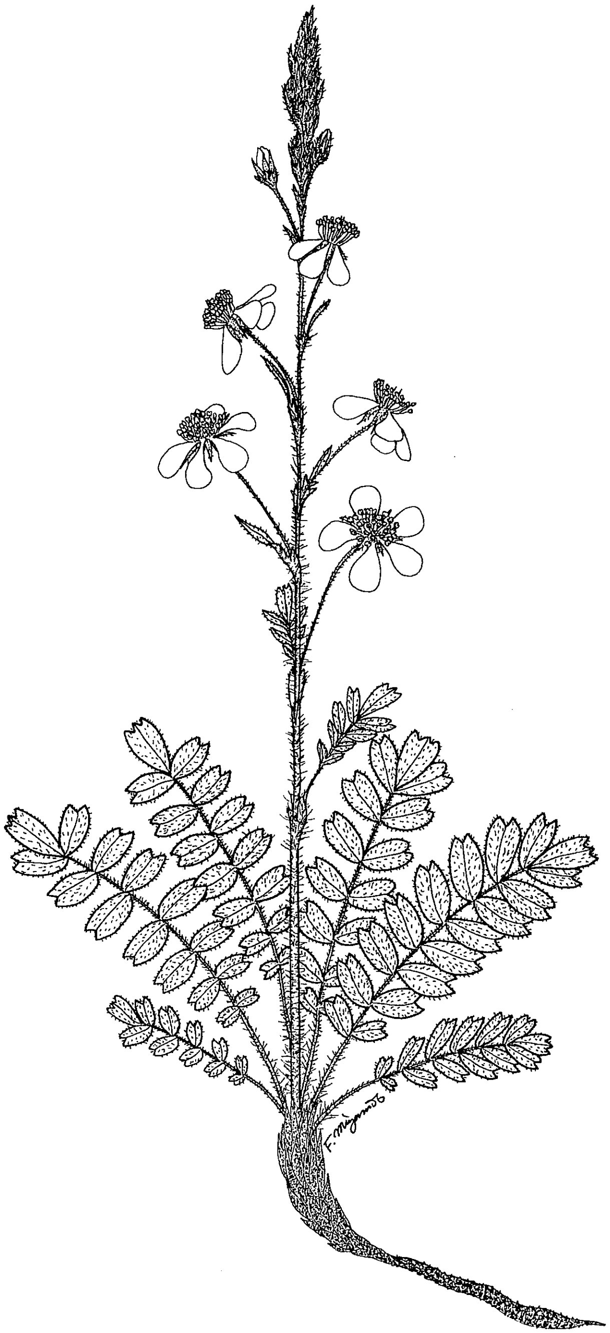

Fig. 7. *Spenceria ramalana* Trimen var. *ramalana* (S. K. Wu & al. 1232, TI).

Mag. **149**: t. 9007 (1923), ut *Spencera*. Hand.-Mazz., Symb. Sin. **7**: 524 (1933). Kitam. in Acta Phytotax. Geobot. **15**: 172 (1953). Icon. Cormophyt. Sin. **2**: 255, t. 2240 (1972). Wu & al., Index Fl. Yunnan. **1**: 541 (1984). Yü & Li in Yü, Fl. Reipubl. Popularis Sin. **27**: 462, t. 75 (1985), pro parte. Yü & al. in Wu, Fl. Xizang. **2**: 683, f. 206 (1985), pro parte. Ku in Wang & al., Vasc. Pl. Hengduan Mts. **1**: 879 (1993). Akiyama & al. in Bull. Natl. Sci. Mus. Tokyo, Ser. B, **28**: 91 (2002). Li & al. in Wu & Raven, Fl. China **9**: 384 (2003).

[Figs. 1, 5, 7]

Flowers 1.5–2 cm across. Episepals semiorbiculate, triangular, or deltate, 2–3.5 mm long, 1.5–3 mm wide, apex obscure or acute. Sepals lanceolate, 4–6 mm long, 1.2–1.8 mm wide. Petals oblanceolate to obovate, 6–10 mm long, 4–6 mm wide, apex rounded or slightly obtuse, and with clawed base. Stamens 20–40.

Chromosome number 2n = 14.

Distr.: NW. Yunnan, SW. Sichuan, and E. Tibet (Fig. 8).

Variety *ramalana* occurs in subalpine to alpine grasslands.

var. **parviflora** (Stapf) Kitam. in Acta Phytotax. Geobot. **15**: 172 (1954).

[Figs. 2, 9]

Spenceria parviflora Stapf in Curtis's Bot. Mag. **149**: sub. t. 9007 (1923). Marquand in J. Linn. Soc. **158**: 175 (1929). Wu & al., Index Fl. Yunnan. **1**: 541 (1984). Grierson in Grierson & Long, Fl. Bhutan **1**(3): 584 (1987). Akiyama & al. in Bull. Natl. Sci. Mus. Tokyo, Ser. B, **28**: 91 (2002). Li & al. in Wu & Raven, Fl. China **9**: 384 (2003).

Type: E. Himalaya (E. Bhutan), Dong Dung (J. C. White s. n., 10 July 1906, K-holo, Fig. 9).

Flowers ca. 1 cm across. Episepals obscure. Sepals widely linear to lanceolate, 3–4 mm long, 0.8–1.3 mm wide. Petals oblanceolate, 5–7 mm long, 3–5 mm wide, apex slightly retuse, and with cuneate base. Stamens 10–18.

Chromosome number 2n = 14.

Distr.: SE. Tibet and E. Bhutan (Fig. 8).

Variety *parviflora* was first described as a species by Stapf (1929) based on small plant

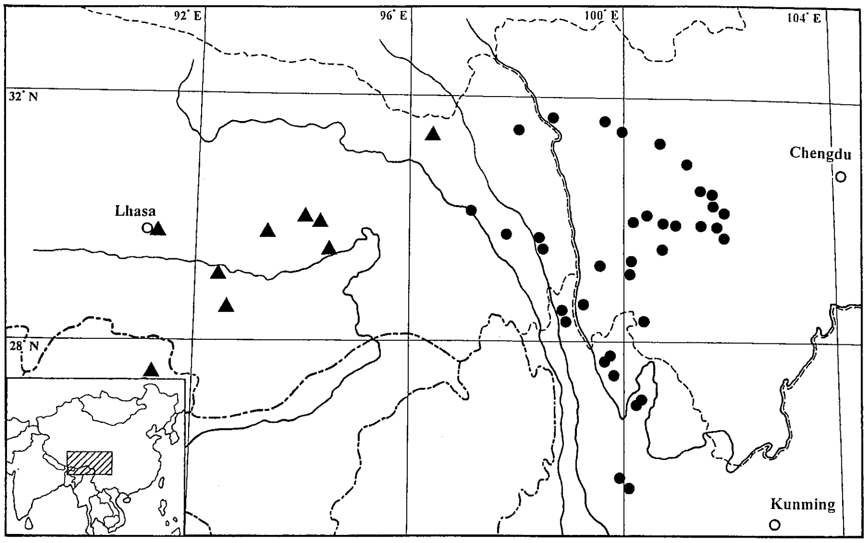

Fig. 8. Distribution map of *Spenceria ramalana* var. *ramalana* (●) and var. *parviflora* (▲).

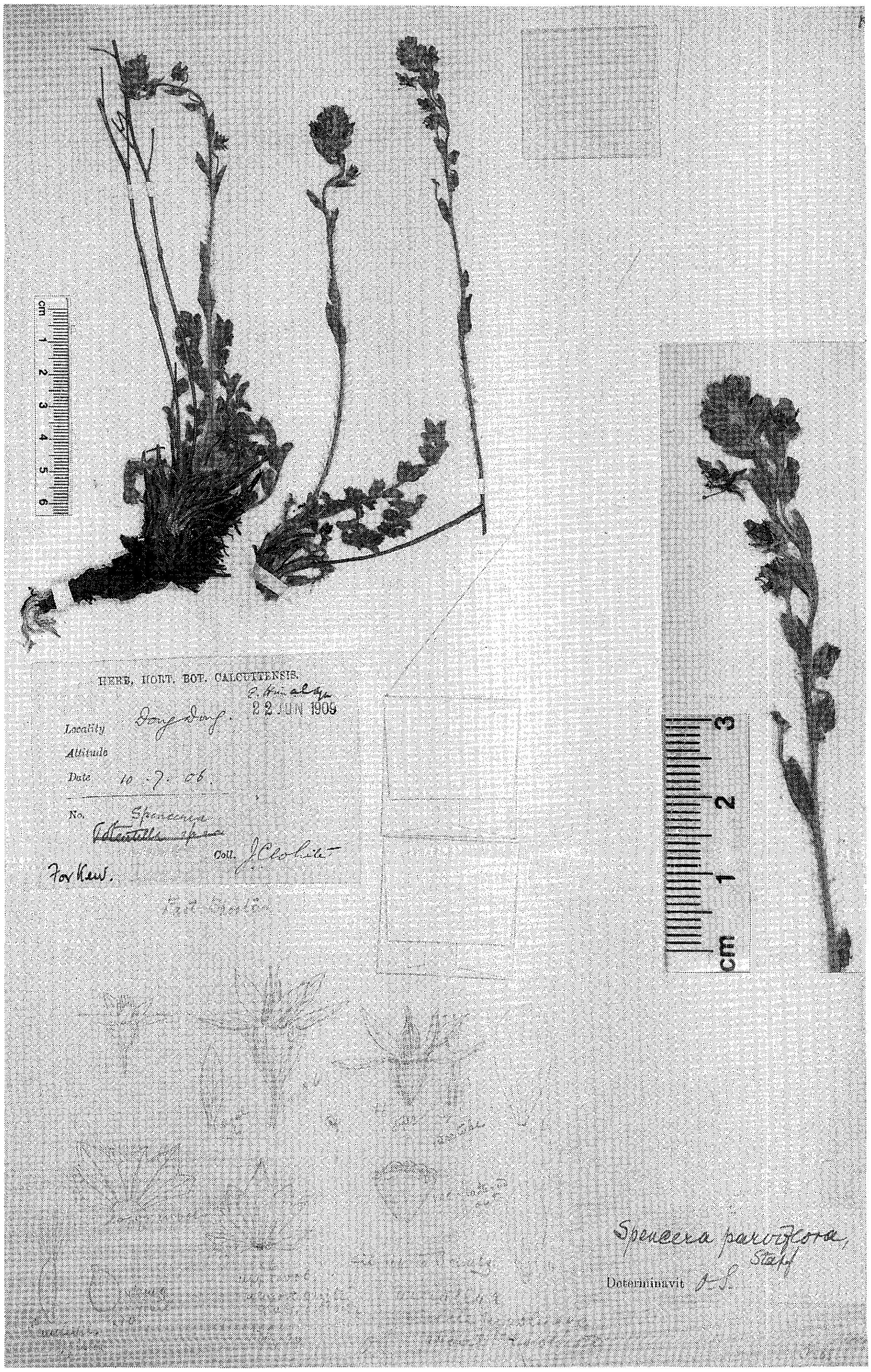

Fig. 9. *Spenceria ramalana* Trimen var. *parviflora* (Stapf) Kitamura (J. C. White s. n., holotype of *S. parviflora* Stapf, K).

size and small flowers. Kitamura (1954) recognized it as a variety of *S. ramalana*, and recent Chinese authors treated it as a synonym of *S. ramalana* (Yü and Li 1985, Yü et al. 1985, Ku 1993). Although vegetative characters, such as plant height, length of leaves, and number of leaflets, are variable and convergent between the two varieties, the size of the flowers and floral parts show distinct geographical variation. Plants from Yunnan, Sichuan, and easternmost of Tibet (approximately east of 97°E) have flowers 1.5–2.0 cm across, while those from Bhutan and the remaining areas of Tibet (approximately west of 97°E) have flowers about 1 cm across. Plants from Yunnan, Sichuan and easternmost Tibet also have developed episepals, larger sepals and petals, and more numerous stamens than those from Bhutan and remaining areas of Tibet. Figure 6 shows geographical variation of petals in *S. ramalana* in NW. Yunnan, SW. Sichuan, and E. and C. Tibet collected between 1994 and 2001. We have concluded that the small flowered plants should be treated as a geographical variety of *S. ramalana*.

We thank the directors and curators of K, KUN, and PE for allowing us to study specimens in their care. We also thank Miss A. Miyahara for her help to measure floral parts of *Spenceria*. We are greatly indebted Dr. D. Boufford, Harvard University, for his critical reading and for correcting the English of the manuscript. This study was partly supported by a Grants-in-Aid from the Ministry of Education, Science, Sports and Culture, Japan, No. 11691178 in 2000 and 2001, and No. 14255005 in 2002 and 2003 (to H.O.) and also by a fund from the Hyogo Technology Association in 1996 (to H.I.).

References

Eide F. 1981. Key for Northwest European Rosaceae pollen. Grana **20**: 101–118.

Franchet A. 1890. Plantae Delavayanae, pp. 216–217. Paul Klincksieck, Paris.

Hara H. and Kurosawa S. 1968. Cytotaxonomic notes on some Asiatic species of *Agrimonia*. J. Jpn. Bot. **43**: 392–400.

Hebda R. J. and Chinnappa C. C. 1994. Studies on pollen morphology of Rosaceae. Acta Bot. Gallica **141**(2): 183–193.

——, —— and Smith B. M. 1988. Pollen morphology of the Rosaceae of Western Canada. I. *Agrimonia* to *Crataegus*. Grana **27**: 95–113.

Hooker J. D. 1865. Rosaceae. *In*: Benthum G. and Hooker J. D. (eds.), Genera Plantarum, pp. 622–623. Lovell Reeve & Co., London.

Kalkman C. 1988. The phylogeny of Rosaceae. Bot. J. Linn. Soc. **98**: 37–59.

Kitamura S. 1954. Tibetan plants collected by E. Kawaguchi III. Acta Phytotax. Geobot. **15**: 172.

Ku T. C. 1993. *Spenceria* Trimen. *In*: Wang W. T., Wu S. G., Lang K. Y., Li P. Q., Pu F. T. and Chen S. K. (eds.), Vascular Plants of the Hengduan Mountains **1**: 879. Science Press, Beijing.

Löve A. 1978. IOPB chromosome number reports LXI. Taxon **27**: 377.

—— 1981. Chromosome number reports LXXIII. Taxon **30**: 834.

Punt W., Blackmore S., Nilsson S. and A. Le Thomas. 1994. Glossary of pollen and spore terminology. LPP Foundation, Utrecht.

Reitsma R. J. 1966. Pollen morphology of some European Rosaceae. Acta Bot. Neerl. **15**: 290–307.

Sharma A. K. and Sharma A. 1980. Chromosome techniques. Theory and practice, 3rd. ed., p. 55. Butterworths, London.

Stapf O. 1923. *Spencera ramalana*. Curtis's Bot. Mag. **149**: t. 9007.

Trimen H. 1879. On *Spenceria*, a new genus of Rosaceae, from western China. J. Bot. (Hooker) **8**: 97–98.

Wang F. S., Chien N. F., Zhang Y. L. and Yang H. Q. 1997. Pollen Flora of China, 2nd ed., p. 354, pl. 167, f. 1. Science Press, Beijing.

Ying T. S., Zhang Y. L. and Boufford D. E. 1993. The Endemic Genera of Seed Plants of China, pp. 609–611. Science Press, Beijing.

Yü T. T. and Li C. L. 1985. *Spenceria* Trimen. *In*: Yü T. T., Lu L. T., Ku T. C., Kuan K. C. and Li C. L. (eds.), Fl. Reipubl. Popularis Sin. **37**: 462–463. Science Press, Beijing (in Chinese).

——, Lu L. T. and Ku T. C. 1985. *Spenceria* Trimen. *In*: Wu C. Y. (ed.), Flora Xizanica **2**: 683–684. Science Press, Beijing (in Chinese).

Appendix: Specimens examined.

Spenceria ramalana var. *ramalana*.

China. **Yunnan**: Hee chan men (J. M. Delavay s. n., K); Eryuang Xian, Nanda Ping, Heishan Men, near Ganhaizi, 2900–3000 m (Dianxibei Jinshajiangdui Exped. 63-6325, 31 July 1963, KUN, PE); In papidosis Hee-chan-men, 3000 m (Delavay 214, 3 Aug. 1884, K); Hee chan men au dessus de Lan Kong (J. M. Delavay 214, 16 Aug. 1883, K); Heqing Xian, Machang (R. C. Ching 23444, 31 July 1929, KUN, PE); Heqing, Baiyan Shaxi, 2800 m (R. C. Ching 24444, 8 Sep. 1929, PE); West China (G. Forrest 28745, 1930–1931, PE); Likiang Snow Range (R. C. Ching 30394, 15 July 1939, KUN); eastern flank of the Lichiang Range, 27°25′N (G. Forrest 6312, Aug. 1910, K, PE); Lichiang Range, 27°30′N, 100°10′E, 8000–10000 ft. (G. Forrest 27889, Aug. 1929, PE); NE of the Yangtze bend, 27°45′N, 10000–11000 ft. (G. Forrest 10554, July 1913, PE); Yangze watershed, Prefectural District of Likiang, eastern slope of Likiang Snow Range (J. F. Rock 4496, June 1922, K); north end of Likiang valley (G. Forrest 2734, K); Mt. Lijiang Xueshan (R. C. Ching 30958, 10 Aug. 1940, KUN); Lijiang, Mt. Yulong, Ganheba, 3100 m (collector unknown, 5 Aug. 1959, KUN); loc. cit., 3176 m (C. Z. Bao 63-20418, 7 Sep. 1963, KUN); Lijiang, Ganhaizi (H. C. He 21290, 21 July 1939 & 21112, 6 Aug. 1939, KUN, PE); loc. cit., 3070 m (S. Chiang 6333, 2 Aug. 1960, KUN, PE); loc. cit., 4250 m (S. K. Wu & al. 838 & 2222, 9 Aug. 1996, KUN, TI); loc. cit., 2720 m (collector unknown 101188, 9 Oct. 1958, KUN); loc. cit. (Y. Z. Zhao 21290, 21 July 1939, KUN); loc. cit., 2900 m (Hengduan Mountains Exped. 02639, 5 Aug. 1981, PE); loc. cit., 3200 m (A. L. Zhang 10051, KUN); loc. cit., 3200 m (R. C. Ching 21112, 6 Aug. 1939, KUN; S. W. Yu & A. L. Zhang 100851, 9 July 1962, KUN); Lijiang Xian, east of Mt. Yulong Shan, 2900 m (Hengduan Mountains Exped. 02663, 5 Aug. 1981, PE); in pratis montanis ad pedem mont. niveor. prope Lichiang, 3200–3600 m (C. Schneider 1915, June 19, 1914, K); Lichiang Snow Range, Xuesong Village, 2800 m (T. T. Yü 15431, 13 Aug. 1937, KUN, PE); loc. cit., 3000 m (T. T. Yü 5041, 7 Apr. 1937, KUN, PE); Lijiang, southwest of Xuesong Village, Baishuiba (Z. G. Zhao 30394, 5 July 1939, KUN); Lijiang Xian, Beishui, 3000 m (S. T. Li 80–238, 23 July 1980, KUN); Lijiang, Dado, Mt. Baishui Shan (Y. K. Gan 6117143, 2 Sep. 1961, KUN); Zhongdian, 3600 m (C. Y. Wu 4208, 7 Aug. 1976, KUN); near Zhongdian City, 3300 m (Zhongdian Exped. 753, 13 Aug. 1962, KUN, PE); Zhongdian, near Bulusai, 3300 m (Zhongdian Exped. 3545, 18 July 1963, KUN); Zhongdian Xian, Tianchi, 3350 m (S. Akiyama & al. 661, 8 July 2000, KU, TI); Chungtien, Tapose, 3100 m (T. T. Yü 12575, 1 Aug. 1937, KUN, PE); Chungtien Tehgoh, 3200 m (T. T. Yü 12425, 25 July 1937, KUN, PE); Zhongdian, near Longtang, 3000 m (T. T. Yü 13699, 12 Oct. 1937, KUN, PE); Zhongdian, near Shudu Hu, 3220 m (S. K. Wu & al. 1232, 23 Sep. 1994, KUN, TI); Zhongdian Xian, Mt. Chengshui, 3200 m (Qian & Sun s. n., 1 Oct. 1986, KUN); Zhongdian Xian, Yicun Longzha, 3300 m (K. M. Feng 23407, 2 Sep. 1959, KUN); Zhongdian, Mt. Shigao Xueshan, near Dege pasture (K. M. Feng 1561, 6 July 1939, KUN, PE); Zhongdian Xian, Forest Farm of Xiao Zhongdian, 3200 m (Qinghai-Xizang Exped. 93, 14 June 1981, PE); A-tun-tze, 2700 m (C. W. Wang 70127, Sept. 1935, KUN, PE); Atuntze, Paimashan, Yenung, 3900 m (T. T. Yü 9592, 12 Aug. 1937, KUN, PE). **Sichuan**: Yanyuan Xian, Yuanbao Qu, at the foot of Mt. Huolu, 3600 m (Qinghai-Xizang Exped. 12183, 21 July 1983, PE); Muli, 3800 m (Y. L. Chang s. n., 25 Sep. 1955, PE); Mu-li, Ku-lu, 3400 m (T. T. Yü 7082, 7 July 1937, KUN, PE); Muli, Wachin, Jin-chang, 3500 m (T. T. Yü 14553, 17 Oct. 1937, KUN, PE); loc. cit., Nupeng-tse, 3600 m (T. T. Yü 6544, 21 June, 1937, KUN, PE); loc. cit., Ching-chang, 3750 m (T. T. Yü 6522, 21 June 1937, KUN, PE); Mu-li, Ye-tse, 3150 m (T. T. Yü 7028, 12 July 1937, KUN, PE); Muli, Kangwu Temple, 3900 m (S. K. Wu 2739, 22 Sep. 1959, KUN); Muli Xian, Yanzui Farm to Kangwu, 3700–3830 m (J. S. Ying 4383, 3 July 1960, PE); Muli Xian, near Kangwu, 3600 m (Qinghai-Xizang Exped. 13204, 21 Aug. 1983, PE); Muli Xian, Sanqu, Baer Farm, 4200–4300 m (Qinghai-Xizang Exped. 14715, 12 Sep. 1983, PE); Muli, between Baowan and Zhangjiang, 3900 m (S. K. Wu 2678, 14 Sep. 1959, KUN); Muli, Liekou, 3560 m (S. L. Chen s. n., 27 Sep. 1955, PE); Daocheng Xian, Gongling, Honggangshan, 4750 m (Sichuan Ecolog. Exped. 2456, 5 Aug. 1973, KUN); Taucheng, Hsion, Kongkaling, 3100 m (T. T. Yü 12954, 28 Aug. 1937, KUN, PE); Daocheng, Chitu, Sanggen Pass, 4300 m (Sichuan Ecolog. Exped. 1908, 25 June 1973, KUN, PE); Daocheng, Haizi (near Daocheng), 4250 m (S. K. Wu & al. 880, 17 Aug. 1996, KUN, TI); Daocheng Xian, Laolinkou, 4000 m (K. Y. Lang & al. 2674, 3 Aug. 1983, PE); Xiangcheng, Sanyatigang, 3900 m (Sichuan Ecolog. Exped. 2740, 24 June 1973, KUN, PE); Xiangcheng Xian, near Si Qu (Qinghai-Xizang Exped. 004587, 11 Aug. 1983, PE); Xiangcheng Xian, east side of Mt. Ma'an, 3400 m (Qinghai-Xizang Exped. 003126, 1 Aug. 1981, PE); Dêrong Xian, east of Mt. Zhege, 4450 m (Qinghai-Xizang Exped. 3488, 7 Aug. 1981, PE); Xikang, Jiulong (K. Huang & al. 00457, 27 June 1930, PE); Kangding (Huang 1377, 9 July 1930, KUN); loc. cit. (Z. S. Liu 1369 in 1934, PE); loc. cit. (C. S. Liu 751, 16 July 1934, PE); Kangding Xian, Shadequ, behind the Gongga Temple, 4000–4750 m (K. Y. Lang & al. 838, 31 July 1982, PE); Kangding Xian, Shadequ, Zimei Village, 3400 m (K. Y. Lang et al. 934, 3 Aug. 1982, PE); Kangding, Mt. Zheduo, Zheduotang, 3450 m (H. L. Tsiang 36183, 5 July 1953, PE); loc. cit., Mt. Guangou, 3750 m (H. L. Tsiang 36251, 9 July 1953, PE); Kangding, on mountain side, 22 km from Mt. Zheduo, 3900 m (H. L. Tsiang & J. H. Xiong 36555, 8 Aug. 1953, PE); Kangding Xian, Zhonggu Village, Dagaibeibo (K. C. Kuan & W. T. Wang 255, 23 July 1963, PE); Xikang, Kangding, Yalagou, near Xindianzi (W. K. Hu & Z. He 10699, 15 Aug. 1951, PE); In monte dicto Ra-Ma-La, Chinae occidentalis, alt. ca. 14300 ft. (R. E. Gill in 1877, K–holotype of *S. ramalana*); Xikang, Taining (W. K. Hu & Z. He 10897, 15 Aug. 1951, PE); Xikang, Reya to Goubuka (Y. W. Tsui 5482, 23 Aug. 1951, KUN, PE); Xikang, Lamula to Bagong (Y. W. Tsui 5703, 15 Sep. 1951, PE); Xikang, Mt. Dapao (W. K. Hu & Z. He 10819, 13 Aug. 1951, PE); Kangding, Xinduqiao, 3500 m (K. C. Kuan & W. T. Wang 607, 17 July 1963, PE); Qianning Xian (B. Z. Guo 20727, 1 July 1977, KUN); on mountain side of S. Qianning City, 3450 m (S. Chiang & T. L. Chin 02117, 17 July 1959, PE); Xikang, on mountain side of the opposite of the Bamei Farm (K. L. Chu 7264, 2 July 1940, PE); Dawu Xian (B. Z. Guo 20901, 5 July 1977, KUN); Garzê District, 1 km north of Dawu Xian City, 3300 m (S. Chiang 9475, 19 July 1961, PE); Yajiang (collector unknown, no. 496, PE); Yajiang Xian, Dadecha, 3650 m (S. Chiang 5227, 16 June 1961, KUN, PE); from Yajiang to Litang, about 70 km to Litang, 4100 m (S. Chiang & T. L. Chin 02701, 2 June 1959, PE); near Litang, 4000 m (S. Chiang 05320, 12 July 1961, KUN, PE); Litang Xian, Xiamula, 3800 m (S. Chiang 05258, 19 June 1961, PE); Litang Xian, en route to Yajiang, 4400 m (K. Y. Lang & al. 2743, 5 Aug. 1983, PE); Batang Xian, Zhongzanqu, Lifu, 3800 m (K. Y. Lang & al. 2258, 22 July 1983, PE); Garzê District, Luhuo Xian, left side of the Xianshui River, the Nigu River, 3300 m (T. S. Ying 9427, 16 July 1961, KUN, PE); Garzê District, 2 km from the S. Garzê City, right bank of the Yalong River, 3600 m (T. S. Ying & al. 9142, 27 June 1961, PE); Garzê Xian, Dajin Temple, Zhuwexiang behind mountain of Rendan pasture, 3950 m (Q. L. Zhang 250253, in 1961, PE); Garzê Xian, on mountain side of the opposite of Dajin Temple, 3700 m (Q. L. Zhang 250451, 22 July 1961, PE); Dêgê Xian, Songlinkou (Y. W. Tsui 4401, 15 July 1951, KUN, PE). **Xizang**: Jomda Xian, Mangdagou, 3800–3900 m (Qinghai-Xizang Comp. Exped. 12476, 25 July 1976, KUN); Qamdo Xian (C. Y. Wu & al. 6030, 28 Sep. 1976, KUN); near Gonjo Xian, 3700 m (Qinghai-Xizang Comp. Exped. 12575, 3 Aug. 1976, KUN); Zogang Xian, Tiantuo Qu (Qinghai-Xizang Comp. Exped. 12175, 1 July 1976, KUN); Markam Xian, Rongxi, 4000 m (Qinghai-Xizang Comp. Exped. 12023, 27 July 1976, KUN); Markam Xian, near Markam, 3850 m (S. Akiyama & al. 104601, 12 July 2000, KUN, TI); Bamgda Xian (C. Y. Wu & al. 4587, 13 Aug. 1976, KUN).

Spenceria ramalana var. *parviflora*.

China. Xizang: Maizhokunggar Xian, Mt. Milha Shan, 4120 m (S. Akiyama & al. 106216, KUN, TI). Riwoqê Xian, near Mt. Changmao, 4100 m (collector unknown 1731, 25 July 1961, KUN); Pasum Labe & Le, 10000–12000 ft. (F. Kingdon-Ward 6103, Aug. 17, 1924, K); Nyingchi Xian, near Minling, 3650 m (C. Y. Wu & al. 75–1169, 5 Aug. 1975, KUN); Nyingchi Xian, near Basum Hu, 3420 m (S. Akiyama & al. 104736, 14 Aug. 2000, KUN, TI); between Pugong and Gesang (P. G. Xiao & al. 2454, 7 Aug. 1965, KUN); Songduo, 4170 m (Y. T. Chang & K. Y. Lang 1388, 7 Aug. 1965, PE); Maizhokunggar Xian, west side of the Mt. Minla, 4100 m (Qinghai-Xizang Ecolog. Exped. 7751, 11 Sep. 1975, PE); Maizhokunggar Xian, Mt. Milha Shan, 4120 m (S. Akiyama & al. 106216, 7 Aug. 2001, KUN, TI); Lhünzê Xian, Gexi, 4100 m (J. W. Zhang 1198, 22 Aug. 1960, PE); Gyaca Xian, west slope of Putrang La, 4380 m (Qinghai-Xizang Exped. 750722, 25 July 1975, KUN); above Singma Rhangcheeng, 11500 ft. (F. S. Chapman 160, 21 Aug. 1936, K). **Bhutan**. Dong Dung (J. C. White s. n., 10 July 1906, K–holotype of *S. parviflora*).

池田　博, 半田久美子, 武　素功, 大場秀章：
***Spenceria* 属（バラ科）の分類誌**

中国・ヒマラヤ要素の一つであり，中国西南部からチベット及びブータンにかけて分布する *Spenceria* 属の分類を詳細に検討した．この属はワレモコウ連に分類され，単型属であることが判った．これまで別種とされることもあった，*Spenceria parviflora* Stapf と *S. ramalana* Trimen は種としては区別できず，前者は後者の地理的変種とするのが妥当であると判断されたためである．外部形態のほか，花粉，染色体数を分析し，属および種・変種の記載を行い，分布図を作成し，引用標本を一覧にして示した．

（[a]岡山理科大学総合情報学部，
[b]兵庫県立人と自然の博物館
自然・環境評価研究部，
[c]昆明植物研究所，
[d]東京大学総合研究博物館）